Name:

at1124exam: Radicals and Squares (v910)

Question 1

Simplify the radical expressions.

$\sqrt{75}$	$\sqrt{18}$	$\sqrt{8}$
$\sqrt{5 \cdot 5 \cdot 3}$	$\sqrt{3 \cdot 3 \cdot 2}$	$\sqrt{2 \cdot 2 \cdot 2}$
$5\sqrt{3}$	$3\sqrt{2}$	$2\sqrt{2}$

Question 2

Find all solutions to the equation below:

$$10\left((x+6)^2 - 9\right) \;=\; 70$$

First, divide both sides by 10.

$$(x+6)^2 - 9 = 7$$

Then, add 9 to both sides.

$$(x+6)^2 = 16$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 6 = \pm 4$$

Subtract 6 from both sides.

$$x = -6 \pm 4$$

So the two solutions are $x = -2$ and $x = -10$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 - 6x = 55$$

$$x^2 - 6x + 9 = 55 + 9$$
$$x^2 - 6x + 9 = 64$$
$$(x-3)^2 = 64$$
$$x - 3 = \pm 8$$
$$x = 3 \pm 8$$
$$x = 11 \quad \text{or} \quad x = -5$$

Question 4

Any quadratic function, with vertex at (h, k), can be expressed in vertex form:

$$y = a(x-h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 3x^2 + 30x + 68$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 3 .

$$y = 3(x^2 + 10x) + 68$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 3(x^2 + 10x + 25 - 25) + 68$$

Factor the perfect-square trinomial.

$$y = 3((x+5)^2 - 25) + 68$$

Distribute the 3.

$$y = 3(x+5)^2 - 75 + 68$$

Combine the constants to get **vertex form**:

$$y = 3(x+5)^2 - 7$$

The vertex is at point $(-5, -7)$.